

Application No.: 10/706,737

Docket No.: 65306-0094

REMARKS

Claims 1-22 are pending. Applicants have amended claim 1 to further define the invention. No new matter has been added. In the Office Action, the Examiner rejected claims 1-22 under 35 U.S.C. §102(e) as being allegedly anticipated by Yonehara et al. (U.S. Patent No. 6,656,271). Applicants respectfully traverse the rejection.

Independent claim 1, as amended, is directed to a method for forming a semi-conductor material that includes

forming a donor substrate constructed of GaAs;
providing a receiver substrate;
implanting nitrogen into the donor substrate to form an implanted layer comprising GaAs and nitrogen;
bonding the implanted layer to the receiver substrate;
annealing the implanted layer to form GaAsN nanostructures and nitrogen micro-blisters in the implanted layer; and
cleaving the implanted layer from the donor substrate.
(*Emphasis Added*).

Similarly, independent claim 19 is directed to a semi-conductor material that includes

a donor substrate constructed of GaAs;
an epitaxial GaAs layer disposed on one side of the donor substrate; and
an implanted layer comprising GaAs and nitrogen disposed in the epitaxial GaAs layer. (*Emphasis Added*).

Contrary to the Examiner's assertion (Office Action, page 2), Yonehara does not teach or suggest 1) a donor substrate "constructed of GaAs"; 2) implanting the donor substrate to form "an implanted layer comprising GaAs and nitrogen"; or 3) annealing the implanted layer "to form GaAsN nanostructures", as required by independent claims 1 and 19, as applicable.

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Rather, Yonehara teaches a process for manufacturing a semiconductor wafer that includes providing a first semiconductor wafer on which a separation layer is formed. One method for forming the separation layer is to inject into the first semiconductor wafer at least one of a hydrogen ion, a rare gas ion, or a nitrogen ion. The implantation forms a layer of fine voids or microbubbles into the first semiconductor wafer. A monocrystalline semiconductor layer is subsequently formed on the separation layer. The semiconductor layer may include Si, Ge, SiGe, SiC, C, GaAs, AlGaAs, InGaAs, InP, InAs, or the like. On top of the semiconductor layer, a support substrate is formed using a bonding or depositing method. Finally, the multilayer structure is separated by externally heating the multilayer structure to so that the fine voids in the separation layer increase, thereby initiating a release phenomenon in the separation layer. (Yonehara, col. 6, line 6 – col. 7, line 20).

In contrast to independent claims 1 and 19, the first semiconductor layer of Yonehara is implanted with a nitrogen ion to create a separation layer. However, there is no teaching or suggestion that the semiconductor layer of Yonehara is “constructed of GaAs”, as required by the donor substrate of claims 1 and 19. Accordingly, if there is no teaching or suggestion that the first semiconductor layer is constructed of GaAs, it is impossible for the implantation of nitrogen into the first semiconductor layer of Yonehara to form “an implanted layer comprising GaAs and nitrogen”, as further required by claims 1 and 19. Admittedly, the fine voids of nitrogen in the separation layer of Yonehara initiate a release phenomenon when externally heated. However, Yonehara does not teach or suggest annealing the implanted layer “to form GaAsN nanostructures”, as required by amended claim 1. Indeed, as discussed above, implanting nitrogen into GaAs is never taught or suggested by Yonehara. As a result, it

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is wholly impossible for Yonehara to teach or suggest an implanted layer comprising GaAs and nitrogen, as required by claims 1 and 19, or the forming of GaAsN nanostructures, as required by amended claim 1.

For at least these reasons, independent claims 1 and 19 are patentable over Yonehara and in condition for allowance. Similarly, for at least the same reasons, claims 2-18 and 20-22, which depend from independent claims 1 and 19, respectively, are also in condition for allowance.

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CONCLUSION

Reconsideration and allowance are respectfully requested. In view of the above, each of the presently pending claims in this application is believed to be in condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Applicant believes any fee due has been addressed in an accompanying transmittal. Please charge our Deposit Account No. 18-0013, under Order No. 65306-0094 from which the undersigned is authorized to draw. To the extent necessary, a petition for extension of time under 37 C.F.R. § 1.136 is hereby made, the fee for which should be charged to such deposit account number.

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Respectfully submitted,

By 

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